38. *Notes on two ciliates, Cyrtolophosis mucicola Stokes and Gastrostyla philippinensis sp. nov., Found in the Soil of the Philippines.*

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So far as I can learn, nothing has up to the present been known of the protozoan fauna in the soil of the Philippines. Recently I have had occasion to examine a soil sample obtained by Mr. ISHII in a field of the Los Baños Agricultural College, where the tobacco, maize and sugar-cane are cultivated in order. The soil examined is a clayey loam. In isolating ciliates the soil sample was inoculated into 2% timothy-hay infusion at a room temperature of about 15° C. The ciliates which made their appearance in the isolation medium were the following four species: *Colpoda cucullus* O. F. MÜLLER, *Cyrtolophosis mucicola* STOKES, *Vorticella microstoma* EHRENBERG and *Gastrostyla philippinensis* sp. nov. This comparatively small number of species is probably due to the small quantity of the soil examined as well as to the rather prolonged storage of the sample before it was submitted to examination. These species, exclusive of the last-named form, are of very wide distribution.

In this communication I intend to record merely *Cyrtolophosis mucicola* and *Gastrostyla philippinensis* sp. nov., leaving the rest untouched, on account of the appearance of their detailed descriptions.

It is a pleasure to thank Mr. T. ISHII who took trouble of sampling the soil while his stay at Los Baños.

Cyrtolophosis mucicola STOKES.

STOKES: Am. Nat., vol. **19** (1885), pp. 439–440, fig. 6; BÜTSCHLI: BRONN's Kl. u. Ord., Bd. **1** (1889), p. 1715; *EDMONDSON: Proc. Devenport Acad. Sci., vol. **11** (1906); CONN & EDMONDSON: Freshwater biology, 1918, p. 282, fig. 504; PENARD: Étude sur les Infusoires d'eau douce, 1922, pp. 117–118, fig. 118; KAHL: Arch. f. Protistenk., Bd. **55** (1926), p. 378, fig C_3 b.

Syn. *Balantiophorus minutus*, SCHEWIAKOFF: Bibl. Zool. Cassel, H. **5** (1889), pp. 64–65, pl. VII, figs. 99–101; *SCHEWIAKOFF: Mém. Acad. Imp. Petersb., 8 ser., 1896, p. 367, pl. VI, fig. 138; *ROUX: Mém. Inst. nat. genevois, vol. **19** (1901); SANDON: Protozoan fauna of the soil, 1927, p. 188; SHIBUYA: Journ. Imp. Agr. Exp. Sta., vol. **1** (1930), pp. 207–208, pl. XX, fig. 17.

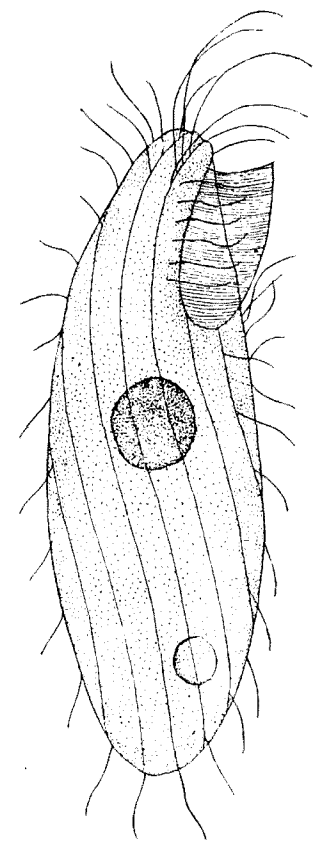
? *Cyrtolophosis major*, KAHL: Arch. f. Protistenk., Bd. **55** (1926), pp. 377–378, fig. C_3 a.

The asterisk marks those to which I could not gain access.

The body is slightly flexible and of an almost elongated ellipsoidal shape which is about thrice as long as broad. Its antero-ventral border is obliquely truncated and exhibits a slight dentation caused by the depression of ciliary lines.

The peristome is represented by an excavated longitudinal groove which occupies the antero-ventral fourth or third of the body length, and is provided with an undulating membrane along its entire border, excepting the anterior part. This membrane is marked with fine transverse stripes and covers the peristome so as to form a pocket, though it is sometimes drawn into the peristome. The mouth opening is located at the posterior extremity of the peristome.

The cilia are rather sparsely arranged in six to eight longitudinal lines on each side of the body, running almost spirally from the right to the left. In addition to these cilia there are found two groups of cilia. The one is composed of long, distally curved and bristle-like cilia and arises from the lateral sides of the anterior proximity to form a "crest" as observed by KAHL. The other is made up of cilia which I intend to call "adoral cilia." These cilia are short, cirrous and arranged in a short row close to the lateral borders of the peristome, much as in *C. major* recorded by KAHL. The adoral cilia are those which have hitherto been overlooked in the present species by a number of previous observers.



Text-fig. 1.
Cyrtolophosis mucicola STOKES.

The macronucleus is spherical and lies near the centre of the body, while the contractile vacuole is located near the posterior extremity.

The body length ranges from 18 to 39 μ, and measures in majority from 30 to 33 μ.

Remarks.—Interesting is it that the present species inhabits a shapeless gelatinous sheath produced by itself. The sheath is highly transparent and can be merely observed by the adhesion of granules such as bacteria, spores and others. Vibrating the cilia of its general body surface the ciliate comes near the entrance of the sheath, and then it takes food by means of the crest and adoral cilia. Oftentimes it violently retreats to the bottom of the sheath probably by the contraction of the body and the whipping reaction of the crest. Occasionally

the ciliate rushes out of the sheath owing to astonishment caused by the collision of larger organisms, or to some other causes. The naked ciliate swiftly swims about performing rotation and enters a ready-made, vacant sheath which it happens to encounter, or a newly-made sheath among or near by the detritus.

Merely on account of larger size, KAHL recorded a form closely related to *C. mucicola* as a new species, calling it *C. major*. However, the present form widely varies in length of the body. I think it reasonable to deal with *major* as synonymous with *mucicola*.

Among the species referred to the genus *Balantiophorus* established by SCHEWIAKOFF *B. minutus*, according to PENARD, is identical with the present species, and *B. bursaria*, according to KAHL, is referable to *Cyrtolophosis*. The taxonomic position of *B. elongatus* SCHEWIAKOFF, *B. chaetophorae* PENARD and *B. mucicola* PENARD have been still left unsettled. To my mind, the first-named species appears to be referable to *Cyrtolophosis*, judging from the presentation of generic characteristics similar to those found in the present species. However, the other two are widely different from *Cyrtolophosis* in the absence of the crest and sheath and also from any other ciliates previously recorded in the possession of two peculiar membranes within the pocket-shaped peristome. Under these circumstances I feel it advisable to institute a new genus for these two forms. This new genus I would like to call *Pinchatia*.

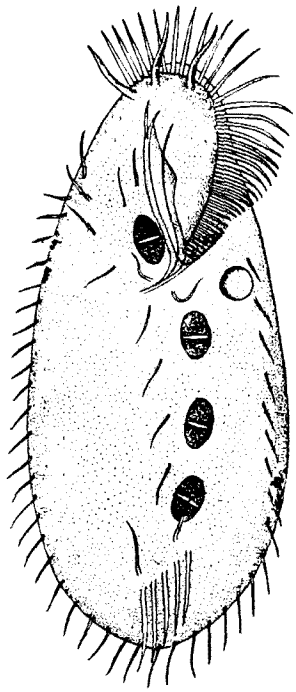
Gastrostyla philippinensis sp. nov.

This new species is most closely allied to *G. steinii* recorded by ENGELMANN,[1] but it may be distinguished from this by the possession of the body fairly flexible and unarmed, and two rows of cilia at the inner base of the reflected border of the peristome and along the submedian line of the peristomial area, as well as by a smaller number of ventral cirri and their irregular arrangement.

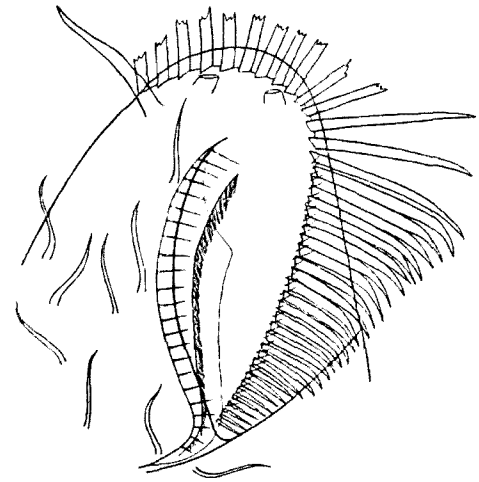
The body which is fairly flexible is elongated elliptical, narrower in the anterior than in the posterior region, convex dorsally and flat ventrally. Its length is twice or a little more the breadth of the posterior part and measures about 200 μ.

The peristome is a shallow, fairly wide excavation which occupies about the anterior third of the entire body. Its right-hand, reflected border bears at the inner base a row of coarse, paroral cilia as well as a conspicuous undulating membrane, while the left-hand border is provided with an adoral series of membranelles in company with a row of

1) ENGELMANN, TH. W.: Zur Naturgeschichte der Infusorien. Zeitschr. f. wiss. Zool., Bd. **11** (1862), S. 383.



Text-fig. 2.
Gastrostyla philippinensis sp. nov.



Text-fig. 3.
Peristomial area of the same.

fine preoral cilia. Moreover another row of endoral cilia is found arranged along the sub-median line of the peristomial area. The peristome bends towards the right at the apex, forming the pharynx.

The frontal cirri are six in number, of which three are well developed along the anterior body-margin and the rest are arranged obliquely from the left to the right near the right-hand border of the peristome. Running obliquely from the right, antero-lateral part to the postero-median part of the body is found a series of some eight ventral cirri in company with four scattered ones, of which two lie near the pharynx and the rest occur near the anal cirri. The anal cirri are four or five in number, and are arranged at a short distance from the posterior margin in an oblique row from the left to the right. Of those only two at the extreme right project a little beyond the posterior margin. The marginal cirri become a little longer towards the posterior extremity of the body where they are not interrupted and project beyond the margin excepting those which occur in the left-hand anterior part.

The macronuclei, each with a clear space in the equatorial region, are ellipsoidal in shape, four in number, and are arranged along the sub-median line of the body.

The contractile vacuole is situated on the left-hand side near the apex of the peristome, while the anus opens out at the posterior extremity in the course of defecation.